

## REMARKS

New Claim 12 has been added to the Application. Support for this Claim is found on page 3, line 18 of the specification. Claim 6 has been amended to indicate that the catalyst being regenerated has been used for oxidizing unsaturated hydrocarbons in the gas phase.

The Patent Office objected to Claim 6 for informal reasons. The Patent Office believes that the Claim should read "have been used" instead of "has been used."

The Patent Office rejected Claims 6-11 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as their invention. Additionally, the Patent Office rejected Claims 6-7 and 9-11 under 35 U.S.C. § 102(b) as being anticipated by United States Patent Number 5,859,265 ("Muller et al."). Also, the Patent Office rejected Claim 8 under 35 U.S.C. § 103(a) as being unpatentable over Muller et al. in view of United States Patent No. 6,031,116 ("Bowman et al."). These rejections are respectfully traversed.

### Objection to Claim 6:

The Patent Office objected to Claim 6 for informal reasons. The Patent Office suggested that in lines 2-3 of Claim 6, the words "has been used" be changed to "have been used". Applicants contend that because the singular form of "catalyst" is used in Claim 6, the use of the words "has been used" is proper.

### Rejection of Claims 6-11 under 35 U.S.C. § 112, second paragraph

Claims 6-11 stand rejected as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as their invention.

The Patent Office believes that in line 3 of Claim 6, the words "the oxidation of unsaturated hydrocarbons in the gas phase" lacks antecedent basis. Applicants have amended Claim 6 to indicate that the catalyst being regenerated has been used for oxidation of unsaturated hydrocarbons in the gas phase. Claim 6, as amended, distinctly claims the subject matter which Applicants regard as their invention.

The Patent Office believes that the words "was produced" in Claim 7 make it unclear as to whether the production of the catalyst by a deposition-precipitation method is actually part of the regeneration process. Also, the Patent Office believes that the use of the words "deposition-precipitation" in Claim 7 make it unclear as to whether or not these words are used in the alternative. Deposition-precipitation is a known method for depositing gold particles on a catalyst support. See Bowman et al., column 9, lines 3-4. Claim 7, therefore, distinctly claims the subject matter which Applicants regard as their invention.

The Patent Office also believes that Claims 7-9 and 11 recite use limitations of a catalyst product rather than positively reciting process steps for regenerating a catalyst. In rejecting a Claim under the second paragraph of 35 U.S.C. § 112, it is incumbent on the Examiner to establish that one skilled in the art, after reading the Claims in light of the specification, would not have been able to ascertain with a reasonable degree of precision and particularity, the particular area set out and circumscribed by the Claims. See Ex parte Wu, 10 U.S.P.Q.2d 2031, 2033 (B.P.A.I. 1988).

Claims 7-9 merely describe the catalyst material being regenerated. Claim 11 is directed to a process for oxidation of unsaturated hydrocarbons in the presence of the regenerated catalyst of Claim 10. One skilled in the art, after reading Claims 7-9 and 11, would be able to ascertain the particular area set out and circumscribed by the Claims. Claims 7-9 and 11, therefore, distinctly claim the subject matter which Applicants regard as their invention.

Applicants believe that Claim 6, as amended, as well as Claims 7-11, particularly point out and distinctly claim the subject matter which they regard as their invention. Applicants, therefore, respectfully request that the Patent Office withdraw its rejection of Claims 6-11 under 35 U.S.C. § 112, second paragraph, and enter allowance of these Claims.

Rejection of Claims 6-7 and 9-11 under 35 U.S.C. § 102(b):

Claims 6-7 and 9-11 stand rejected as being anticipated by Muller et al. Regarding Claim 6, the Patent Office believes that Muller et al. disclose a method for

regenerating a catalyst composed of titanium silicalite with a gold modifier comprising contacting the catalyst with a solution of hydrogen peroxide in mineral acid. Regarding Claim 7, the Patent Office believes that Muller et al disclose chemical vapor deposition and making a white suspension reaction mixture from solution. Regarding Claim 9, the Patent Office believes that Muller et al. disclose a catalyst in contact with 0.196% hydrogen peroxide. Regarding Claim 10, the Patent Office believes that Muller et al. disclose a method for regenerating a catalyst composed of titanium silicalite with a gold modifier. Finally, regarding Claim 11, the Patent Office believes that Muller et al. disclose gas phase olefin epoxidation in the presence of hydrogen.

In order for a reference to anticipate, the claimed invention must be the same as that of the reference. See Glaverbel Societe Anonyme v. Northlake Marketing & Supply Inc., 45 F.3d 1550, 33 U.S.P.Q.2d 1496, 1498 (Fed. Cir. 1995). Applicants' claimed invention is not anticipated by Muller et al. because Applicants' claimed invention is different than the invention disclosed by Muller et al.

Regarding Claims 6 and 10, Muller et al. disclose a catalyst composed of titanium or vanadium silicalite having a zeolite structure and containing platinum metals, wherein the platinum metals are each present in at least two different bond energy states. See column 1, lines 29-43. In contrast, Applicants' claimed invention is directed to a process for regenerating a catalyst composed of a titanium dioxide or hydrous titanium oxide support coated with gold particles.

Catalyst development is an unpredictable science. See Exhibit 1, Kirk-Othmer, Encyclopedia Of Chemical Technology, 4<sup>th</sup> Ed., Vol. 5, p. 368, wherein it states "[C]atalyst development is largely a matter of trial and error testing".

Additionally, Thiele et al. note that the properties of catalysts composed of titanium silicalites have unique activity in the activation of aqueous hydrogen peroxide. See G.F. Thiele et al., Propylene Epoxidation with Hydrogen Peroxide and Titanium Silicalite Catalyst: Activity, Deactivation and Regeneration of the Catalyst, page 352 (submitted to the Patent Office on July 27, 2000).

Claims 6 and 10 of Applicants' claimed invention are not anticipated by Muller et al. due to the fact that the catalyst disclosed in Muller et al. is not the same as the catalyst disclosed in Applicants' claimed invention.

Notwithstanding the foregoing, Claims 6 and 10 are also not anticipated by Muller et al. because the catalyst regeneration of Muller et al. is different from the regeneration process of Applicants' claimed invention.

As the Patent Office admits, Muller et al. disclose that, if required, the catalyst of their invention can be regenerated by contacting the catalyst with a solution of hydrogen peroxide in mineral acid. See column 5, lines 16-18. Applicants' claimed regeneration process involves contacting a catalyst with water **or** dilute acid **or** a dilute hydrogen peroxide solution. See the Application, page 3, line 18; Examples 4, 5, 6 and 10.

Regarding Claim 7, Muller et al. may disclose the use of chemical vapor deposition for modifying a catalyst composed of a titanium or vanadium silicalite having a zeolite structure and containing platinum metals, wherein the platinum metals are each present in at least two different bond energy states. However, Muller et al. do not disclose a method for regenerating a catalyst composed of a titanium dioxide or hydrous titanium dioxide support coated with gold particles produced by a deposition-precipitation method. As mentioned above, deposition-precipitation is a known method for depositing gold particles on a catalyst support. See Bowman et al., column 9, lines 3-4. Claim 7, therefore, is not anticipated by Muller et al.

Regarding Claim 9, Muller et al. disclose a process for preparing hydrogen peroxide from hydrogen and oxygen in the presence of their disclosed catalyst. See column 4, lines 62-65. In Example 3, Muller et al. disclose suspending, in a reactor, a catalyst composed of a titanium or vanadium silicalite having a zeolite structure and containing platinum metals, wherein the platinum metals are each present in at least two different bond energy states, and introducing into the reactor a feed of hydrogen and oxygen.

Muller et al. do not disclose a method for regenerating catalytic activity of a catalyst composed of a titanium dioxide or hydrous titanium dioxide support coated with gold particles wherein the regeneration comprises contacting the catalyst with an aqueous hydrogen peroxide solution having a concentration less than or equal to 10%. Claim 9, therefore, is not anticipated by Muller et al.

Finally, regarding Claim 11, although Muller et al. may disclose gas phase olefin epoxidation in the presence of hydrogen, Muller et al. do not disclose a process for the oxidation of unsaturated hydrocarbons in the presence of a regenerated catalyst produced by the regeneration process of Applicants' claimed invention. The regenerated catalyst produced by the regeneration process of Applicants' claimed invention is composed of a titanium dioxide or hydrous titanium oxide support coated with gold particles. Claim 11, therefore, is not anticipated by Muller et al.

Since Muller et al. do not disclose the same invention as Applicants' claimed invention, the reference cannot be used to render Applicants' claimed invention unpatentable. Considering the foregoing, Applicants respectfully request that the Patent Office withdraw its rejection of Claims 6-7 and 9-11 under 35 U.S.C. § 102(b) and enter allowance of these Claims.

Rejection of Claim 8 under 35 U.S.C. § 103(a):

The Patent Office rejected Claim 8 under 35 U.S.C. § 103(a) as being unpatentable over Muller et al. in view of Bowman et al. The Patent Office believes that Bowman et al. disclose a catalytic regeneration process comprising a regeneration gas and water. The Patent Office thus concludes that it would have been obvious to one having ordinary skill in the art to use the water of Bowan et al. with the regeneration of Muller et al.

In order to support a rejection based on obviousness, the prior art must provide a motivation or reason for the worker in the art, without the benefit of the Applicants' specification, to make the necessary changes in the referenced invention. See Ex parte Chicago Rawhide Manufacturing Co., 226 U.S.P.Q. 438 (PTO Bd. App. 1984).

As mentioned above, Muller et al. disclose a catalyst composed of titanium or vanadium silicalite having a zeolite structure and containing platinum metals, wherein the platinum metals are each present in at least two different bond energy states. If required, the catalyst of Muller et al. may be regenerated with a solution of hydrogen peroxide in a mineral acid. See column 5, lines 16-18.

In order to "arrive at" Applicants' claimed invention, the skilled artisan would have had to ignore the fact that Muller et al. do not even teach or motivate the skilled artisan to change the catalyst being regenerated from a catalyst composed of titanium silicalites to a catalyst composed of a titanium dioxide or hydrous titanium dioxide support coated with gold particles.

Bowman et al. disclose a catalyst comprising gold on a titanosilicate. See column 5, lines 49-50. The catalyst of Bowman et al. may be regenerated in an atmosphere of regenerated gas and water. See column 13, lines 4-6.

The Patent Office states that Bowman et al. disclose that water is beneficially added to the gas stream. This disclosure, however, does not provide any motivation to combine the water of Bowman et al. with the solution of hydrogen peroxide in mineral acid disclosed by Muller et al. In fact, one skilled in the art would have had no motivation to add water to a process for regenerating catalysts composed of titanium silicalites because Thiele et al. teaches that extraction with water of catalysts composed of titanium silicalites gives no significant improvement of catalytic activity. See G.F. Thiele et al., Propylene Epoxidation with Hydrogen Peroxide and Titanium Silicalite Catalyst: Activity, Deactivation and Regeneration of the Catalyst, page 356 (submitted to the Patent Office on July 27, 2000).

Even if the references were combined, there still would have been no suggestion, teaching or motivation for one skilled in the art to regenerate catalyst activity of a catalyst composed of a titanium dioxide or hydrous titanium dioxide support coated with gold particles by contacting the catalyst with water or dilute acid or dilute hydrogen peroxide solution and steam under pressure, as claimed in Applicants' invention.

Applicants respectfully submit that the Patent Office is incorrectly using their disclosure to piece together the prior art to render their claimed invention obvious. Since hindsight such as this is not allowed, the Patent Office cannot combine Muller et al. with Bowman et al. to render Applicants' claimed invention obvious. Applicants therefore respectfully submit that their claimed invention is not obvious over Muller et al. in view of Bowman et al. Applicants, therefore, respectfully request that the Patent Office withdraw its rejection of Claim 8 under 35 U.S.C. § 103(a) and enter allowance of this Claim.

CONCLUSION

For the foregoing reasons, Applicants respectfully request: that the objection to Claim 6 be withdrawn; that the rejection of Claims 6-11 under 35 U.S.C. § 112, second paragraph, be withdrawn; that the rejection of Claims 6-7 and 9-11 under 35 U.S.C. § 102(b) be withdrawn; that the rejection of Claim 8 under 35 U.S.C. § 103(a) be withdrawn; and that pending Claims 6-11 be allowed to issue as a U.S. patent.

Respectfully submitted,

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**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**In the Claims:**

New Claim 12 has been added as follows:

--12. A method for regenerating catalytic activity of a catalyst composed of a titanium dioxide or hydrous titanium dioxide support coated with gold particles that has been used for oxidation of unsaturated hydrocarbons in the gas phase comprising contacting the catalyst with water or dilute acid.--

Please amend Claim 6 to read as follows:

6. (Once Amended, Marked-Up) A method for regenerating catalytic activity of a catalyst composed of a titanium dioxide or hydrous titanium dioxide support coated with gold particles that has been used for [the] oxidation of unsaturated hydrocarbons in the gas phase comprising contacting the catalyst with water, dilute acid or a dilute hydrogen peroxide solution.